# Preface

## Integrated Streambank Protection Guidelines

The Aquatic Habitat Guidelines collection was created by a consortium of public agencies to assist property owners, planners, designers and regulators protect and restore marine, freshwater and riparian fish and wildlife habitat. The agencies involved in developing this series include the Washington Department of Fish and Wildlife, the Washington State Department of Transportation, the Washington Department of Ecology, the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service. The authors of the guidelines are widely recognized experts in their fields. The content and organization of information is based on a set of guiding principles developed by professional resource managers, engineers and other practitioners.

These guidelines provide "how to" guidance that, while scientific in approach, can be understood and used by volunteers, planners, designers and managers of aquatic restoration projects and facilities. Each guideline is based on current best science and technical practice surveyed in topical state-of-the-knowledge white papers or a thorough literature search. Their content includes background science and literature; policy issues; site and vicinity environmental-assessment processes; project-design processes, standards and details; and case studies. Technical-assistance materials produced under the Aquatic Habitat Guidelines program include documents in printed, compact-disc and web-page format, as well as training and outreach workshops. You can obtain additional copies of this and other available guideline documents, downloadable versions of white papers, drafts of guidelines in development and other information about the Aquatic Habitat Guidelines on line by visiting www.wa.gov/wdfw/hab/ahg, or by filling out and mailing or faxing the registration form found in Appendix A of this guideline.

The overwhelming majority of Washington's fish and wildlife species depend on aquatic and riparian ecosystems for all or part of their life cycle. This rich and diverse fauna and the flora on which they depend are irreplaceable elements of Washington's natural resources and are the basis for much of the state's cultural heritage, economy and quality of life. Unfortunately, in our enthusiasm for enjoying and developing land surrounding these aquatic habitats, we have destroyed, degraded and fragmented many of our most precious marine, freshwater and riparian ecosystems. Over time, these adverse impacts have resulted in the federal listing of many marine, freshwater and riparian animal species as "endangered" or "threatened" under the federal Endangered Species Act, and the state of Washington's wildlife protection legislation. Of particular note is the listing of several salmon species under the ESA.

In 1999, Governor Gary Locke and several Washington State agencies adopted a statewide strategy to protect and restore salmon habitat in the state. At the heart of the strategy is the hands-on involvement of landowners and other individuals. Incentives and technical assistance in salmon protection/recovery initiatives are included in the strategy to encourage such participation. In the 1999-2001 biennium, Washington State distributed nearly $50 million to more than 300 salmon protection/recovery projects sponsored by local governments, watershed groups, County Conservation Districts, Regional Fisheries Enhancement Groups, volunteer groups and individuals. For such involvement to be effective, there is an urgent need for increased technical guidance to ensure that these local efforts are strategic in approach, address the source of a problem and not just the symptoms, make the best use of limited funds and are based on the best available science that can be consistently and effectively applied across the landscape. The Aquatic Habitat Guidelines program is designed to help provide this technical assistance.

Each guideline in the Aquatic Habitat Guidelines series is designed in part to provide technical guidance supporting regulatory streamlining; however, it is important to remember that the information in these guidelines is not a substitute for the law. *Current local and state policies, rules and regulations supersede any and all recommendations made in these guidelines.*

The Aquatic Habitat Guidelines Program was created to:

- address habitat requirements and guide recovery projects for marine, freshwater and riparian species listed under the federal ESA;
- facilitate consistent application of good science and technical practice for project designs, construction and operations affecting aquatic systems;
- increase the success rate and enhance the worthwhile expenditure of public funds on protection and recovery projects;
- streamline and reduce costs for environmental review and permitting for activities that affect marine, freshwater and riparian ecosystems; and
- provide a single set of benchmarks for evaluating and prioritizing projects affecting aquatic and riparian habitats.

To carry out such a mission, the program is designed to meet the following objectives:

- make the expertise of professional resource managers available to a wide variety of organizations and citizens who are seeking assistance in habitat protection and restoration activities;
- streamline local, state and federal regulatory review of activities involving aquatic environments by providing guidelines based on best available science;
- provide a scientific basis for any future changes to current local policies or activities associated with aquatic resource in the state; and
- maintain ongoing reviews and updates to the Aquatic Habitat Guidelines to reflect experience and emerging science and technical practice.

## GUIDING PRINCIPLES

The Aquatic Habitat Guidelines Guiding Principles summarize current, scientific understanding about how ecosystems work, and they reflect current resource-agency policy and technical approaches to protect ecosystem functions. Documenting this scientific and technical understanding and policy will enable managers and project proponents to assess the effectiveness of the Aquatic Habitat Guidelines in their efforts to protect and restore salmonid habitats as well as other aquatic and riparian habitats. As scientific understanding improves through time, these guidelines will be updated to reflect the evolution of thought.

The guiding principles are organized from general concepts to topical statements. They were developed by the Aquatic Habitat Guidelines Steering Committee, whose membership includes the Washington Department of Fish and Wildlife, Washington State Department of Transportation and the Washington Department Ecology. In addition, Department of Fish and Wildlife Habitat Program technical staff provided valuable input in their development. Some of the principles were taken directly or expanded from other planning documents such as the Wild Salmonid Policy (Washington Department of Fish and Wildlife, 1997), the Statewide Strategy to Recover Salmon (State of Washington, 1999) and Coastal Salmon Conservation: Working Guidance for Comprehensive Salmon Restoration Initiatives on the Pacific Coast (National Marine Fisheries Service, 1996). Links to the websites containing these documents can be found at "Links and References" on the Washington Department of Fish and Wildlife's website at www.wa.gov/wdfw/hab/ahg/.

### Guiding Principles for General Ecosystem Function:

1. Ecological processes create and maintain habitat function. These processes include:

    a. Geomorphic processes - the interaction of water, sediment and wood that creates channel and shoreline structure. Geomorphic processes include bank and bed erosion, channel migration and evolution, sedimentation, debris influences, erosion, accretion, sediment transport and fire.

    b. Biological processes (e.g., nutrient cycling, species interactions, riparian and upland vegetation dynamics; and species-mediated, habitat-forming processes such as beaver activity).

Salmon and other aquatic organisms have evolved and adapted to use the habitats created by these processes. The long-term survival of naturally occurring populations of these species depends on the continuation of these processes.

2. Ecological processes create and sustain a suite of ecosystem characteristics and functions that include:

    a. ecosystem complexity, diversity and change;

    b. ecological connectivity;

    c. riparian interactions;

    d. floodplain connectivity;

    e. species diversity, adaptation and survival;

    f. water quality and water quantity;

    g. invertebrate production and sustained food-web function.

3. These characteristics and functions have biological value as well as economic, social, cultural, educational and recreational values.

4. Because these characteristics and functions vary across and within watersheds, the use of local watershed information in planning and design will often lead to less risk of adverse project impacts. Natural processes that are protected and restored will minimize risk and provide sustainability to ecosystem functions.

   This principle is paraphrased from the State of Washington (1999):

   a. Maintain and restore the freedom of rivers and streams to move and change, especially during floods.

   b. Allow time for natural regenerative processes to occur and provide recovery of river and stream integrity.

   c. Protect the natural diversity of species and restore the natural diversity of habitats within river channels and riparian zones.

   d. Support and foster habitat connectivity.

   e. Tailor actions locally and to the whole watershed in the proper sequence of time and place. Match the system's potential and long-term human commitment to stewardship of the system.

   The principle is also paraphrased from the National Marine Fisheries Service (1996):

   a. To ensure no net loss of habitat functions and to enable natural processes to occur unimpeded, actions should benefit ecological functions. Actions that adversely affect habitat should be avoided.

   b. Maintain habitats required for salmonids during all life stages from embryos and alevins through adults.

   c. Maintain a well-dispersed network of high-quality refugia to serve as centers of population expansion.

   d. Maintain connectivity between high-quality habitats to allow for reinvasion and population expansion.

   e. Maintain genetic diversity.

## General Guiding Principles for Project Planning and Implementation:

1. A holistic approach to project planning employs ecologically relevant units of management, such as watersheds.

2. Our limited understanding of ecological processes and engineered solutions is addressed by using the best available science and erring on the side of caution in project management, design, timing and construction.

3. A holistic approach to project planning recognizes and maintains geomorphic processes (e.g., channel migration, channel evolution, hydrologic changes, erosion, sedimentation, accretion and debris influences).

4. Appropriate uses of riparian, shoreline and floodplain systems through responsible land-use practices can maintain natural processes and avoid cumulative, adverse effects.

5. A holistic approach to compensatory mitigation and restoration is desirable; such an approach is based on local watershed conditions, and it strives to maintain or restore historical, ecological functions.

6. Compensatory mitigation for adverse impacts has risk and uncertainty of success. To minimize such risk and uncertainty, adverse impacts are first avoided and then minimized. Unavoidable, adverse impacts are addressed by compensating for losses.
7. Complete compensatory mitigation includes consideration of the project impacts over time (which usually extends beyond the completion of the project) and across the landscape (which often extends beyond the boundaries of the project).
8. Appropriate operating and maintenance procedures are necessary to ensure that project objectives are fulfilled and adverse environmental impacts are minimized.
9. Monitoring and adaptive management are critical components of restoration, mitigation and management activities.

## Guiding Principles for Bank Protection:

1. Natural erosion processes and rates are essential for ecological health of the aquatic system.
2. Human-caused erosion that exceeds natural rates and amounts is usually detrimental to ecological functions.
3. Natural processes of erosion are expected to occur throughout the channel-migration zone. Project considerations should include the channel-migration zone and potential upstream and downstream effects.
4. Preservation of natural channel processes will sustain opportunities for continued habitat formation and maintenance.

It is our nature as human beings to live, work and recreate along and adjacent to waterways, whether freshwater or marine. Our lives and histories are inextricably linked to water. How we affect those waterways has long-term survival consequences not only for fish and wildlife, but for humanity. The Aquatic Habitats Guidelines Program is intended to help balance man's need to protect life and livelihood with the need to protect and restore valuable habitat for fish, for wildlife and for ourselves.

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